Amendments to the Specification:

Please replace the paragraph beginning on page 7, line 23, with the following amended paragraph:

Fig. 1A ~~shows~~ is a representation of a system for performing multiple binding reactions in accordance with an ~~one~~ embodiment of the present subject matter ~~invention~~;

Please add the following new paragraph after the paragraph beginning on page 7, line 23:

Fig. 1B is another representation of a system for performing multiple binding reactions in accordance with an embodiment of the present subject matter;

Please replace the paragraph beginning on page 7, line 25, with the following amended paragraph:

Fig. 2 ~~shows~~ is a representation of a system for performing multiple binding reactions in accordance with another embodiment of the present subject matter ~~invention~~;

Please replace the paragraph beginning on page 7, line 27, with the following amended paragraph:

Fig. 3A ~~shows~~ is a representation of a method for preparing a probe array in accordance with an ~~one~~ embodiment of the present subject matter ~~invention~~;

Please add the following ***THREE*** new paragraphs ***after*** the paragraph beginning on page 7, line 27:

Fig. 3B is a representation of a method for preparing a probe array in accordance with another embodiment of the present subject matter;

Fig. 3C is a representation of a method for preparing a probe array in accordance with an additional embodiment of the present subject matter;

Fig. 3D is a representation of a method for preparing a probe array in accordance with a further embodiment of the present subject matter;

Please replace the paragraph beginning on page 8, line 1, with the following amended paragraph:

Fig. 4A ~~shows~~ is a representation of a method for preparing a probe array in accordance with yet another embodiment of the present subject matter ~~invention~~;

Please add the following new paragraph ***after*** the paragraph beginning on page 8, line 1:

Fig. 4B is a representation of a method for preparing a probe array in accordance with an additional embodiment of the present subject matter;

Please replace the paragraph beginning on page 8, line 3, with the following amended paragraph:

Fig. 5A ~~shows~~ is a graphical representation of binding curves of IL-4 to anti-IL-4 antibody at Ligand 1 of a probe array obtained by a ~~the~~ method of the present subject matter ~~invention~~; ~~and~~

Please add the following ***FIVE*** new paragraphs ***after*** the paragraph beginning on page 7, line 27:

Fig. 5B is a graphical representation of binding curves of IL-4 to anti-IL-4 antibody at Ligand 2 of a probe array obtained by a method of the present subject matter;

Fig. 5C is a graphical representation of bindings curve of IL-4 to anti-IL-4 antibody at Ligand 3 of a probe array obtained by a method of the present subject matter;

Fig. 5D is a graphical representation of binding curves of IL-4 to anti-IL-4 antibody at Ligand 4 of a probe array obtained by a method of the present subject matter; and

Fig. 5E is a graphical representation of binding curves of IL-4 to anti-IL-4 antibody at Ligand 5 of a probe array obtained by a method of the present subject matter;

Fig. 5F is a graphical representation of binding curves of aIL-4 to anti-IL-4 antibody at Ligand 6 of a probe array obtained by a method of the present subject matter;

Please replace the paragraph beginning on page 8, line 5, with the following amended paragraph:

Fig. 6A is a graphical representation of ~~shows~~ binding curves of ~~five antigen targets to~~ Anti IgG1 to six antibody probes;[[.]]

Please add the following ***FOUR*** new paragraphs ***after*** the paragraph beginning on page 7, line 27:

Fig. 6B is a graphical representation of binding curves of Anti IgG2b to six antibody probes;

Fig. 6C is a graphical representation of binding curves of Anti IgA to six antibody probes;

Fig. 6D is a graphical representation of binding curves of Anti IgG1 to six antibody probes;

Fig. 6E is a graphical representation of binding curves of Anti IgG3 to six antibody probes;

Please replace the paragraph beginning on page 8, line 6, with the following amended paragraph:

Fig. 7A is a graphical representation of ~~shows~~ binding curves of various compound targets to six CYP450 enzyme probes;[[.]]

Please add the following ***FIVE*** new paragraphs ***after*** the paragraph beginning on page 8, line 6:

Fig. 7B is graphical representation of additional binding curves of various compound targets to six CYP450 enzyme probes;

Fig. 7C is a graphical representation of several more binding curves of various compound targets to six CYP450 enzyme probes;

Fig. 7D is a graphical representation of response verse concentration for five Cytochrome-P450 (CYP) enzyme probes (3A4, 2C19, 1A2, 2C9 and 2D6);

Fig. 7E is another graphical representation of response verse concentration for five Cytochrome-P450 (CYP) enzyme probes (3A4, 2C19, 1A2, 2C9 and 2D6); and

Fig. 7F is an additional graphical representation for five Cytochrome-P450 (CYP) enzyme probes (3A4, 2C19, 1A2, 2C9 and 2D6).

Please replace the paragraph beginning on page 10, line 14, with the following amended paragraph:

Fig. 2 schematically shows a system **11** for simultaneously carrying out multiple binding assays in accordance with another embodiment of this aspect of the invention. The system **11** includes an SPR device **20** having several components in common with the SPR device **80** shown in Figs. 1A and 1B, and similar components are indicated with the same reference numeral in both figures. In particular, the SPR device **80** includes an optical system comprising an array **24** of light sources **26,** a prism **30** having a sensor surface **32**, a lens **46** having an optical axis **48**, and a two dimensional

photosurface **54** such as a CCD. A suitable SPR conductor (not shown) is formed on the sensor surface.

Please replace the paragraph beginning on page 11, line 25, with the following amended paragraph:

Figs. 3A, 3B, 3C, and 3D schematically show ~~shows a~~ methods for preparing a probe array on a surface **70** in accordance with one embodiment of the method of the invention. In Fig. 3a, a first surface region **72a** on the surface **70** is activated. Activation of a surface region allows probe molecules to be adsorbed to the surface region. One or more probe species **71** are then adsorbed to the activated first surface region **72** (Fig. 3b) at distinct microspots in the first surface region **72**. Fig. 3b schematically shows the application of 6 probe species **71a** to **71f** to the activated first surface region **72a**. This is by way of example only and the method of the invention may be carried out with any number of probe species **71** being adsorbed to the first surface region **72**. This produces the probe array shown in Fig. 3c, in which each probe species is adsorbed to a different microspot **74**. Fig. 3c shows 6 microspots **74a** to **74f**. The probe species may all be different or some of the probe species may be the same possibly at different concentrations.

Please replace the paragraph beginning on page 12, line 24, with the following amended paragraph:

The method of preparing a probe array on a surface shown in Figs. 3A, 3B, 3C, and 3D will now be demonstrated with reference to the system **10** of Figs. 1A and 1B. In

this example, m^2 probe species are to be adsorbed to the SPR surface at the m^2 microspots **58** (m^2=25 in the SPR device **80** of Figs. 1A and 1B) located at the m^2 crossover regions of the m probe regions with the m target regions. To prepare an appropriate microarray of the m^2 probes on the probe regions, the flow cell **34** is first placed in one orientation (Fig. 1b) and buffer or water is first pumped through the first microchannels **36** in order to clean and prepare the first surface region **43a**. Flow of buffer or water through the first microchannel **36a** is then stopped a solution of a chemical surface activator is then made to flow through the first microchannel **36a** in order to activate the first surface region **43a**. The first surface region is now activated.

Please replace the paragraph beginning on page 15, line 3, with the following amended paragraph:

The method of preparing a probe array on a surface shown in Figs. 3A, 3B, 3C, and 3D will now be demonstrated with reference to the system **11** of Fig. 2. In this example, m X n probe species are to be adsorbed to the SPR surface that at the m X n microspots **58** (m X n = 25 in the system **11** of Fig. 2) located at the m X n crossover regions of the m microchannels **36** with the n strip electrodes **33**. To prepare an appropriate microarray of the m X n probes on the strip electrodes **33**, buffer or water is first pumped through the microchannels **36** to clean and prepare the strip electrodes for immobilization of the probe molecules at the microspots **58**. Flow of buffer or water through the m microchannels is then stopped and the first strip electrode **33a** is now activated as explained above. The remaining strip electrodes are all brought to a potential with respect to the reference electrode **62** having a polarity opposite to that of

the first electrode. An appropriate solution comprising a probe species is pumped through each of the m microchannels **36**. The m probe species may all be different, or some may be the same probe species, possibly at different concentrations. As a result of the activation of the first strip electrode **33a** and the charge on the m probe species in the microchannels, each probe species is adsorbed to the first strip electrode **33a** and is not adsorbed by the other n-1 strip electrodes **33b-33e**. Each of the probe species is thereby immobilized at a different one of the m microspots **58** located at the m crossover regions of the m microchannels with the first strip electrode **33a**. The probes are substantially prevented from immobilizing at the m X (n-1) microspots **58** located at the crossover regions of the m microchannels with the n-1 other strip electrodes **33b-33e**.

Please replace the paragraph beginning on page 17, line 3, with the following amended paragraph:

Figs. 4A and 4B show[[s]] a method for preparing a probe array on a surface **80** in accordance with another embodiment of the method of the invention (termed "OSK" or "one-shot kinetics"). This embodiment may be used when it is desired to perform a binding assay involving one probe species and one target species at different combinations of probe and target concentrations. In this embodiment, m probe regions **82** are simultaneously activated. 6 probe regions **82a** to **82f** are shown in Fig. 4a. This is by way of example only, and the method may be carried out with any number of probe regions. The m probe regions **82** are activated and the probe is adsorbed onto

the probe regions **82**. A different probe concentration is adsorbed onto each probe region. One of the probe regions **82f** may be used as a reference region upon which no probe is adsorbed.

Please replace the paragraph beginning on page 17, line 18, with the following amended paragraph:

The method of performing a binding assay shown in Figs. 4A and 4B will now be demonstrated with reference to the system 10 of Figs. 1A and 1B. This embodiment is used when it is desired to perform a binding assay involving one probe species and one target species at different combinations of probe and target concentrations. The probe species is applied to each of the m probe regions at a different concentration, and the target is applied to each of the m target regions at a different concentration. To prepare this microarray, the flow cell **34** is first placed in the probe orientation (Fig. 1a) and buffer or water is first pumped through the m microchannels **36** in order to clean and prepare the m probe regions **42**. Flow of buffer or water through the m microchannels **36** is then stopped and any residual buffer or water in the flow system is drained away. A solution of a chemical surface activator is then made to flow through the m microchannels **36** in order to activate the m probe regions **42**. The surface activator may be, for example, EDC/NHS. The m probe regions are now activated.

Please replace the paragraph beginning on page 19, line 12, with the following amended paragraph:

The method of performing a binding assay shown in Figs. 4A and 4B will now be demonstrated with reference to the system **11** of Fig. 2. The probe species is applied to each of the m probe regions at a different concentration, and the target is applied to each of the m target regions at a different concentration. To prepare this microarray, the flow cell **34** is positioned as shown in Fig. 2 with the m microchannels **36** perpendicular to the n strip electrodes **33**. Buffer or water is first pumped through the microchannels **36** to clean and prepare the SPR surface in contact with the microchannels Flow of buffer or water through the m microchannels is then stopped and the n strip electrodes **33** are now activated as explained above. An appropriate solution comprising the probe is pumped through each of the m microchannels **36**. In this embodiment, the probe is present in each of the different microchannels at a different concentration. As a result of the activation of the strip electrodes **33** and the charge on the probe in the microchannels, probe molecules are adsorbed to the strip electrodes **33**. Probe molecules are thereby immobilized at a different one of the n microspots **58** located at the n crossover regions of the microchannel with the n strip electrodes **33**.

Please replace the paragraph beginning on page 21, line 8, with the following amended paragraph:

A binding assay was carried out using the system **10** shown in Figs. 1A and 1B. Anti-IL-4 antibody (αIL-4) was used as a probe in this experiment and was localized on the SPR surface in each of six rectangular probe regions **42** (see Figs. 1A and 1B), as

explained above in the description of the system **10**. The probe regions were labeled (a) to (f). The density of the antibody, *in "response units"* (RU), in each of the 6 probe regions is given in Table 1.

Please replace the paragraph beginning on page 21, line 18, with the following amended paragraph:

IL-4 was used as the target in this experiment was presented to the αIL-4 in each of five target regions **43** (see Figs. 1A and 1B), as explained above. The target regions were numbered 1 to 5. The concentration of IL-4 in each target region is given in Table 2.

Please replace the paragraph beginning on page 22, line 4, with the following amended paragraph:

The binding assay thus involved 30 binding reactions that were performed simultaneously. Binding of IL-4 to αIL-4 in the 30 microspots was monitored simultaneously as described above. The results of the binding are shown in Figs. 5A, 5B, 5C, 5D, 5E and 5F. Each graph in Figs. 5A, 5B, 5C, 5D, 5E and 5F shows binding of IL-4 to αIL-4 in the probe region indicated in the graph. Each of the 5 curves in the graph shows the results of the binding of IL-4 to αIL-4 in the microspot located at the intersection of the probe region of the graph and the target region specified for each curve. At the times indicated by the arrow in each graph, unbound IL-4 was rinsed away, and the dissociation of bound IL-4 from αIl-4 in the 30 microspots was monitored simultaneously by the method of the invention. The processor **63** was configured to analyze the curves in

each graph to obtain the association constant (Ka) and the dissociation constant (Kd) of the binding of Il-4 to αIL-4 at the antibody concentration of the graph. The Ka and Kd of each graph are shown in each of the graphs in Figs. 5A, 5B, 5C, 5D, 5E and 5F. From these, the affinity constant (KD) can be derived, as is known in the art.

Please replace the paragraph beginning on page 22, line 20, with the following amended paragraph:

Binding between 6 antibody probes (αIgG1, αIgG2b, αIgA, αIgG2a and αIgG3) to 5 antigen targets (IgG1, IgG1, IgG2a, IgG2b and IgG3) was studied using the system **10** of Figs.1A and 1B. The concentrations used of the probes and targets are given in Tables 3 and 4, respectively. The binding curves obtained are shown in Figs. 6 A, 6B, 6C, 6D and 6E, and the binding response of each of the 30 binding reactions is shown in Table 5.

Please replace the paragraph beginning on page 24, line 13, with the following amended paragraph:

The binding of five Cytochrome-P450 (CYP) enzyme probes (3A4, 2C19, 1A2, 2C9 and 2D6) with 6 different targets (Ketoconazole, Nifedipine, Dextromethorphan, Diclofenac, Dulfaphenazole and Propranolol) was carried out using the system **10** of Figs. 1A and B. The targets were presented at concentrations of 1,000, 500, 250, 125, 62.5, 31.25, 15.5, and 7.8 μM. The affinity constant, KD was determined for each reaction. The results are shown in Figs. [[-]]7A, 7B, 7C, 7D, 7E and 7F, and Table 6.

Please replace the paragraph beginning on page 25, line 8, with the following amended paragraph:

Table 7 shows immobilization of Rabbit IgG and Goat IgG probes on 36 independent microspots prepared by the method shown in Figs. 3A, 3B, 3C and 3D, using the system **10** of Figs. 1A and 1B. Each probe region was sequentially activated and six alternate probes of Rabbit IgG and Goat IgG were adsorbed onto the activated probe region. This resulted in the immobilization of 36 alternate probes in the 36 microspots (6 in each surface region), as shown in Table 7.